

REMARKS

The Examiner has rejected claims 1, 2, and 12 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2003/0160841 to Takata et al (“Takata”). The Examiner has also rejected claims 3 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of U.S. Patent No. 4,559,545 to Iemura et al (“Iemura”). The Examiner has also rejected claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of U.S. Patent Application No. 2004/0094067 to Oyanagi et al (“Oyanagi”). The Examiner has also rejected Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of U.S. Patent No. 4,488,161 to Tsutsumi et al (“Tsutsumi”). The Examiner has also rejected claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of U.S. Patent No. 5,801,728 to Yanagi et al (“Yanagi”). The Examiner has rejected Claims 4-8 as being dependant upon a rejected base claim. The Examiner has indicated that these claims would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. Applicant has currently amended Claim 1, and has added a new Claim 17. Claims 1-17 are currently pending. The following remarks are considered by applicant to overcome each of the Examiner's outstanding rejections to current claims 1-17. An early Notice of Allowance is therefore requested.

I. SUMMARY OF RELEVANT LAW

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The determination of obviousness rests on whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. In determining obviousness, four factors should be weighed: (1) the scope and content of the prior art, (2) the differences between the art and the claims at issue, (3) the level of ordinary skill in the art, and (4) whatever objective evidence may be present. Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. The

Examiner carries the burden under 35 U.S.C. § 103 to establish a prima facie case of obviousness and must show that the references relied on teach or suggest all of the limitations of the claims.

II. REJECTION OF CLAIMS 1, 2, AND 12 UNDER 35 U.S.C. § 102(E) BASED ON TAKATA

In paragraph 2 of the Office Action, the Examiner rejects claims 1, 2, and 12 under 35 U.S.C. § 102(e) as being anticipated by Takata. These rejections are respectfully traversed and believed overcome in view of the following discussion.

With respect to this rejection, the Examiner contends that Takata discloses “a rigid member (73 of Fig 10) having a higher degree of rigidity than said flexible wiring board **and disposed on said flexible wiring board in contact with at least said end portion (see Par [0123]).**” 7/28/06 Office Action, P. 2, ¶ 3 (emphasis added). However, this misconstrues the teachings of Takata. In particular, Takata does not disclose a rigid member disposed on a flexible wiring board in contact with at least an end portion.

Independent Claim 1

The ink-jet head unit generally set forth in pending Claim 1 includes an ink-jet head (10) having a row of terminals (39,40) exposed on a surface thereof for energizing a plurality of ejection-energy generating elements (12) to eject an ink from nozzles, a flexible wiring board (13) jointed in an end portion (13b) thereof to the row of terminals (39, 40) and having an inclined portion (13a) extending obliquely from the ink-jet head (10), and **a rigid member (20; 21; 27)** having a higher degree of rigidity than the flexible wiring board and **disposed on the flexible wiring board in contact with at least the end portion** of the flexible wiring board.

The rigid member (20; 21; 27), held in contact with the end portion of the flexible wiring board, permits the flexible wiring board to be easily bent at a position near the end of its end portion (13b) such that the inclined portion (13a) not reinforced by the rigid member extends obliquely from the end of the end portion, without deformation of the end portion which is reinforced by the rigid member. See, Application, ¶ [0008]. The rigid

member effectively protects a solder (15), used to bond the flexible wiring board to the terminals (39, 40) of the ink-jet head, from a force which would act on the solder so as to cause separation or removal of the solder from the terminals and/or the end portion (13b) of the flexible wiring board (13), when the flexible wiring board is bent at a position between the end portion (13b) and the inclined portion (13a). See, Application, ¶ [0024] (rigid member 20 of Fig. 4); ¶ [0025] (rigid member 21 of Fig. 5); ¶ [0026] (rigid member 27 of Figs. 6A and 6B).

The Examiner contends that these above referenced features are not recited in the rejected claims. However, it is the Applicant's position that these features or advantages are inherent to the structure recited in Claim 1, that is, inherent to the rigid member "having a higher degree of rigidity than said flexible wiring board and disposed on said flexible wiring board in contact with at least sad end portion". The recited rigid member prevents deformation of the end portion of the flexible wiring board, and protects a solder (15) used to bond the flexible wiring board to the terminals (39, 40) of the ink-jet head, from a force which would otherwise act on the solder so as to cause separation or removal of the solder from the terminals and/or the end portion (13b) of the flexible wiring board (13), when the flexible wiring board is bent at a position between the end portion (13b) and the inclined portion (13a). The Examiner's alleged rigid member 72 of Tanaka does not have these features.

Independent Claim 1 of the current application requires:

a flexible wiring board having a wiring pattern jointed in an end portion thereof to said row of terminals of said ink-jet head, said flexible wiring board extending in a direction perpendicular to a direction of extension of said row of terminals, and including an inclined portion extending from said end portion obliquely upwardly and outwardly of said surface of said ink-jet head; and

a rigid member having a higher degree of rigidity than said flexible wiring board and disposed on said flexible wiring board in contact with at least said end portion, on a side of said end portion opposite to that which is jointed to said row of terminals." (emphasis added)

Takata never discloses a rigid member as recited in Claim 1. Takata merely shows a known ink-jet head unit 25 including an ink-jet head 24 (Fig. 2), and flexible wiring

board 49 (Figs. 3, 7, 10, and 11) **which is joined in an end portion thereof to terminals 491 of actuator 70 of the ink-jet head 24**, as shown in Fig. 7 and 10 and described in paragraph [0105], in particular.

The actuator 70 includes center plate 73 and a pair of channel members 72 fixed to the center plate 73, as described in paragraph [0105], and each channel member 72 has ejection channels 74 having respective nozzles 75 (Figs. 7 and 9), so that an ink supplied from ink cartridge 22 is ejected from the nozzles 75 through manifold 71 (paragraph [0108], and Figs. 7 and 9) and ejection channels 74 (paragraphs [0108] and 0110)).

Contrary to the Examiner's view that the center plate 73 is equivalent to the rigid member as recited in Claim 1, this center plate 73 is not equivalent to **the recited rigid member, which is in contact with at least said end portion of the wiring board on a side of said end portion opposite to that which is jointed to said row of terminals**. Takata discloses that center plate 73 is in contact with channel members 72, which have ejection channels 74. See, Takata, Figs. 7 and 10. It is the channel members 72 that the flexible wiring board 49 is in contact with, not the center plate 73. See, Takata, Figs. 7 and 10. Center plate 73 is not in direct contact with flexible wiring board 49.

Furthermore, the center plate 73 referred to by the Examiner, and the channel members 72 adjacent to the center plate 73 are parts of the actuator 70 of the ink-jet head 24 (paragraph 0104, lines 1-2, and paragraph 0106, lines 1-3), and the center plate 73 is not in contact with the flexible wiring board 49. As such, Takata does not disclose "a rigid member ... disposed on said flexible wiring board in contact with at least said end portion, on a side of said end portion opposite to that which is jointed to said row of terminals."

In addition, the rigid board 39 of Iemura is also not in contact with a side of the end portion of the wiring board 42 opposite to that which is jointed to said row of terminals. Iemura discloses that rigid board 19 is connected to recording electrode patterns 20. Iemura, Col. 3, Lns. 64-65. Iemura also discloses that the "output terminal of each driver ship 21 is connected to the corresponding recording electrode patterns 20 through a film carrier 23." Iemura, Col. 4, Lns. 20-25. As such, Iemura discloses that the film carrier 23 is directly connected to only two items, the electrode patterns 20 and the driver ship 21. Since

Iemura discloses that the electrode patterns 20 lie between the film carrier 23 and the rigid board 19, , Iemura does not disclose “a rigid member ... disposed on said flexible wiring board in contact with at least said end portion, on a side of said end portion opposite to that which is jointed to said row of terminals.”

Furthermore, the rigid boards 19, 39 of Iemura function to hold electrode patterns 20, 40 (Col. 3, Lns. 64-66; Col. 7, Lns. 19-21), and are equivalent in function to the channel members 72 of Tanaka, but are not equivalent to the rigid member recited in Claim 1.

In fact, in all of the references cited to by the Examiner, the objects cited to as being “rigid members” are located on the same side of the flexible wiring that is jointed to the wiring pattern. Not a single reference cited to disclosed a rigid member “on a side of said end portion opposite to that which is jointed to said row of terminals.” Therefore, Applicant respectfully submits that Claim 1 is in allowable form.

As such, Applicant respectfully asserts that Examiner has failed to establish a prima facie case of anticipation of independent Claim 1, and corresponding claims 2 and 12 because they are dependant from independent Claim 1. Therefore, Applicant respectfully requests that Examiner remove the rejection of claims 1, 2, and 12 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2003/0160841 to Takata et al.

Claim 2

Claim 2 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 2. In addition, Claim 2 specifies that “said rigid member includes an overhang portion located between said inclined portion and a joined portion of said wiring pattern and said terminals.”

Examiner contends that protruding portion 73a of center plate 73 satisfies the above claim element. However, as discussed above, center plate 73 does not satisfy the “rigid member” element of Claim 1. Therefore, protruding portion 73a cannot be an “overhang portion” of a “rigid member” as set forth in Claim 2. It is therefore respectfully requested that Examiner remove the rejection of Claim 2 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2003/0160841 to Takata et al.

**III. REJECTION OF CLAIMS 3 AND 14 UNDER 35 U.S.C. § 103(A) BASED ON TAKATA IN
VIEW OF IEMURA**

In paragraph 7 of the Office Action, the Examiner rejects claims 3 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of Iemura. These rejections are respectfully traversed and believed overcome in view of the following discussion.

With respect to the rejection of Claim 3, Examiner contends that Iemura discloses that “said rigid member (19) is ... in contact with a surface area of said flexible wiring board which is larger than that of said joined portion of said wiring pattern and said terminals (20, also see Fig 3).” 7/28/06 Office Action, P. 3-4, ¶ 9 (internal quotations omitted). With respect to the rejection of Claim 14, Examiner contends that Iemura discloses “said rigid member (39) is bonded to said flexible wiring board (42, see col 7 ln 62-64).” 7/28/06 Office Action, P. 4, ¶ 11 (internal quotations omitted). Examiner contends that all other claim elements are disclosed by Takata. However, this misconstrues the teachings of Takata and Iemura. Particularly, as discussed above, Takata never discloses a “rigid member” as in Claim 1. Furthermore, Iemura does not disclose a “rigid member” that is a planar member in direct contact with a surface area of said flexible wiring board which is larger than that of the joined portion of the wiring pattern and the terminals. Nor does Iemura disclose a “rigid member” that is a rectangular member bonded to a flexible wiring board.

Claim 3

Claim 3 is dependent upon Claim 2, which is in turn dependant from Claim 1. As Claim 1 is allowable, so must be Claim 3. In addition, Claim 3 specifies that “said rigid member is **a planar member in contact with a surface area of said flexible wiring board** which is larger than that of said joined portion of said wiring pattern and said terminals.” Application, P. 19-20 (emphasis added).

As discussed above, Takata does not disclose a “rigid member” as in Claim 1. Also as discussed above, the rigid board 39 of Iemura is not in direct contact with the flexible wiring board 42, as iterated in Claim 1 of the current Application. Iemura discloses that rigid board 19 is connected to recording electrode patterns 20. Iemura, Col. 3, Lns. 64-65. Iemura

also discloses that the “output terminal of each driver ship 21 is connected to the corresponding recording electrode patterns 20 through a film carrier 23.” Iemura, Col. 4, Lns. 20-25. As such, Iemura discloses that the film carrier 23 is directly connected to only two items, the electrode patterns 20 and the film carrier 23. Since Iemura discloses that the film carrier 23 is directly connected to the electrode patterns 20, and not directly to the rigid board 19, Iemura does not disclose “a planar member in contact with a surface area of said flexible wiring board....” It is therefore respectfully requested that Examiner remove the rejection of Claim 3 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent No. 4,559,545 to Iemura et al.

Claim 14

Claim 14 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 14. In addition, Claim 14 specifies that “said rigid member is **a rectangular member bonded to said flexible wiring board.**” Application, P. 21 (emphasis added).

As discussed above, Takata does not disclose a “rigid member” as in Claim 1, and rigid board 19 of Iemura is not in direct contact with film carrier 23. See, Iemura, Col. 3, Lns. 64-65, Col. 4, Lns. 20-25, Fig 3. As such, the flexible wiring board 19 of Iemura, if bonded to anything, would have to be bonded to the electrode patterns 20 and not to the rigid board 19. Thus, rigid board 19 cannot be “a rectangular member bonded to said flexible wiring board.” It is therefore respectfully requested that Examiner remove the rejection of Claim 14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent No. 4,559,545 to Iemura et al.

IV. REJECTION OF CLAIMS 9-11 UNDER 35 U.S.C. § 103(A) BASED ON TAKATA IN VIEW OF OYANAGI

In paragraph 12 of the Office Action, the Examiner rejects claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of Oyanagi. These rejections are respectfully traversed and believed overcome in view of the following discussion.

With respect to the rejection of claims 9-11, Examiner contends that Oyanagi discloses that “a plate of a synthetic resin, such as polyethylene terephthalate, or a metal (see Par [0062]) as a substitute for a ceramic” 2/21/06 Office Action, P. 5, ¶ 14. Examiner contends that all other claim elements are disclosed by Takata. However, this misconstrues the teachings of Takata and Iemura. Particularly, as discussed above, Takata never discloses a “rigid member” as in Claim 1. Furthermore, Oyanagi does not disclose a “rigid member” that is formed of a synthetic resin, polyethylene terephthalate, or a metallic material.

Claim 9

Claim 9 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 9. In addition, Claim 9 specifies that “said rigid member is **formed of a synthetic resin.**” Application, P. 21 (emphasis added).

As discussed above, Takata does not disclose a “rigid member” as in Claim 1. Oyanagi discloses a **nozzle plate**, the material of which may include metals, ceramics, silicones, glass, and plastics. Oyanagi, ¶ [0062]. The nozzle plate of Oyanagi is not a “rigid member” as in Claim 1 as it is not “disposed on said flexible wiring board in contact with at least said end portion.” As such, the nozzle plate of Oyanagi cannot be a “rigid member” formed of a synthetic resin as in Claim 9. Furthermore, examiner admits that Takata does not disclose a “rigid member” formed of a synthetic resin. 2/21/06 Office Action, P. 4, ¶ 13. It is therefore respectfully requested that Examiner remove the rejection of Claim 9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent Application No. 2004/0094067 to Oyanagi et al.

Claim 10

Claim 10 is dependent upon Claim 9, which is in turn dependant from Claim 1. As Claim 1 is allowable, so must be Claim 9. In addition, Claim 10 specifies that the synthetic resin of said “rigid member” “includes polyethylene terephthalate.” Application, P. 21.

As discussed above, Takata does not disclose a “rigid member”. Oyanagi discloses a **nozzle plate** made of polyethylene terephthalate. Oyanagi, ¶ [0062]. Also, as discussed in relation to Claim 9, the nozzle plate of Oyanagi is not a “rigid member” as in

Claim 1, let alone a “rigid member” formed of a synthetic resin including polyethylene terephthalate. Furthermore, examiner admits that Takata does not disclose a “rigid member” formed of a synthetic resin which includes polyethylene terephthalate. 2/21/06 Office Action, P. 4, ¶ 13. It is therefore respectfully requested that Examiner remove the rejection of Claim 10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent Application No. 2004/0094067 to Oyanagi et al.

Claim 11

Claim 11 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 11. In addition, Claim 11 specifies that “said rigid member is **formed of a metallic material.**” Application, P. 21 (emphasis added).

As discussed above, Takata does not disclose a “rigid member” as in Claim 1. Oyanagi discloses a **nozzle plate**, the material of which may include metals, ceramics, silicones, glass, and plastics. Oyanagi, ¶ [0062]. Also, as discussed in relation to Claim 9, the nozzle plate of Oyanagi is not a “rigid member” as in Claim 1, let alone a “rigid member” formed of a metallic material. Furthermore, examiner admits that Takata does not disclose a “rigid member” formed of a metallic material. 2/21/06 Office Action, P. 4, ¶ 13. It is therefore respectfully requested that Examiner remove the rejection of Claim 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent Application No. 2004/0094067 to Oyanagi et al.

V. REJECTION OF CLAIM 13 UNDER 35 U.S.C. § 103(A) BASED ON TAKATA IN VIEW OF TSUTSUMI

In paragraph 15 of the Office Action, the Examiner rejects Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of Tsutsumi. This rejection is respectfully traversed and believed overcome in view of the following discussion.

Claim 13 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 13. In addition, as discussed above, Takata does not disclose a “rigid member” as in

Claim 1. Nor does Tsutsumi disclose a “rigid member” as in Claim 1, and Examiner does not contend otherwise. It is therefore respectfully requested that Examiner remove the rejection of Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent No. 4,488,161 to Tsutsumi et al.

VI. REJECTION OF CLAIMS 15 AND 16 UNDER 35 U.S.C. § 103(A) BASED ON TAKATA IN VIEW OF YANAGI

In paragraph 17 of the Office Action, the Examiner rejects claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Takata in view of Yanagi. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Claim 15 is dependent upon Claim 1. As Claim 1 is allowable, so must be Claim 15. In addition, as discussed above, Takata does not disclose a “rigid member” as in Claim 1. Nor does Yanagi disclose a “rigid member” as in Claim 1, and Examiner does not contend otherwise. It is therefore respectfully requested that Examiner remove the rejection of Claim 15 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0160841 to Takata et al in view of U.S. Patent No. 4,488,161 to Yanagi et al.

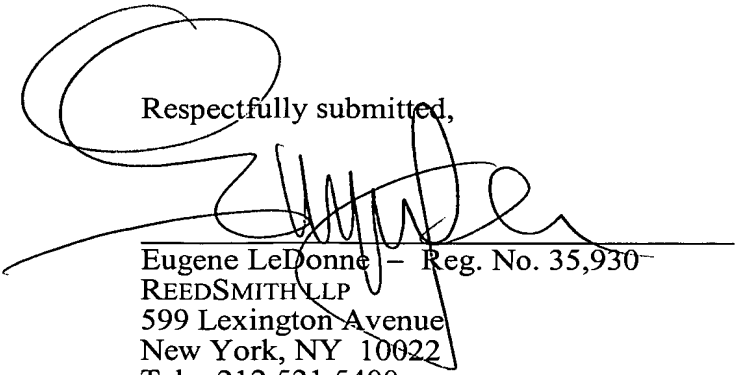
VII. REJECTION CLAIMS 4-8 AS BEING DEPENDANT UPON A REJECTED BASE CLAIM

In paragraph 19 of the Office Action, the Examiner objects to claims 4-8 as being dependant upon a rejected base claim. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Claims 4-8 are all dependant from Claim 1. As Claim 1 is allowable, so must be claims 4-8. It is therefore respectfully requested that Examiner remove the rejection of claims 4-8 as being dependant upon a rejected base claim.

Based upon the above remarks, Applicant respectfully requests reconsideration of this application and its early allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,



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